

In the claims:

Please amend the claims as follows:

1. (Amended) A method of changing the bandgap energy in an Indium Gallium Arsenide Phosphide (InGaAsP) semiconductor quantum well structure, wherein the composition fraction for each of Indium, Gallium, Arsenide and Phosphide ranges from zero to one, the method comprising:

(a) providing a quantum well structure comprising an Indium Gallium Arsenide Phosphide (InGaAsP) quantum well active region; and

(b) on top of said quantum well structure, providing a ~~first Indium Phosphide semiconductor layer with phosphorus vacancy type~~ such that the layer as grown includes defects;
~~or and~~

~~(c) on top of said quantum well structure, providing a first Indium Phosphide layer with defects that diffuse as phosphorus interstitial type defects; and~~

~~(d) (c) applying a Rapid Thermal Annealing (RTA) process for controlled diffusion of vacancy type the defects in the first Indium Phosphide semiconductor layer to the Indium Gallium Arsenide Phosphide (InGaAsP) quantum well active region, or applying a Rapid Thermal Annealing (RTA) process for controlled diffusion of interstitial type defects in the first Indium Phosphide layer to the Indium Gallium Arsenide Phosphide (InGaAsP) quantum well active region.~~

2. (Amended) A method as defined in claim 1 29, which includes growing said first Indium Phosphide layer with phosphorus antisite defects (phosphorus atoms sitting on an indium atom site) above said first Indium Phosphide layer by means of Molecular Beam Epitaxy (MBE) at low temperature (less than 360 degrees Celsius).

3. (Amended) A method as defined in ~~elaims~~ claim 2, which includes applying said Rapid Thermal Anneal (RTA) process for dissociation of the phosphorus antisite defects into phosphorus interstitial defects and indium vacancy defects with controlled diffusion of said interstitial type defects, thereby providing an increase in the effective bandgap energy of the Indium Gallium Arsenide Phosphide quantum well active region.

4. (Amended) A method as defined in claim 1 27, which includes growing said first Indium phosphide layer with phosphorus vacancy type defects above the upper quaternary layers of the Indium Gallium Arsenide Phosphide (InGaAsP) quantum well structure by means of Molecular Beam Epitaxy (MBE).

5. (Previously Amended) A method as defined in claim 4, which includes growing said first indium phosphide layer with phosphorus vacancy type defects using Helium-Plasma assisted Molecular Beam Epitaxy (MBE).

6. (Original) A method as defined in claim 5, wherein said Helium-Plasma assisted Molecular Beam Epitaxy includes: exposing said first indium phosphide layer to a flux of Helium particles during Molecular Beam Epitaxy growth.

7. (Previously Amended) A method as defined in claim 6, wherein exposing said first indium phosphide layer to a flux of Helium particles during Molecular Beam Epitaxy growth provides phosphorus vacancy type defects within said first indium phosphide layer.

8-14. (Canceled)

15. (Amended) A method as defined in claim 1 26, wherein varying the thickness of the low temperature grown Indium Phosphide layer changes the bandgap energy and hence the emission wavelength in the Indium Gallium Arsenide Phosphide over a range of 0-140 nm or more.

16. (Previously Amended) A method as defined in claim 15, wherein said bandgap energy and hence the emission wavelength changes over said range of 0-140 nm or more in a single thermal anneal step.

17-21. (Previously canceled).

22. (Previously Amended) A method as defined in claim 15, wherein the reduced temperature MBE process is performed at a temperature of 300°C.

23. (Previously Added) A method as defined in claim 15, wherein the thickness of the grown Indium Phosphide layer is not greater than 1000Å.

24. (Amended) A method as defined in claim 1 ~~2~~ 26, wherein the first Indium Phosphide layer has a thickness not greater than 400Å.

25. (Previously Added) A method as defined in claim 15, wherein the change in the bandgap energy can be spatially varied by using low-temperature indium phosphide in different thicknesses over different areas of the quantum well structure using a single thermal anneal step to change emission wavelengths over said range of 0-140 nm or more.

26. (New) A method as defined in claim 1, wherein step (b) comprises providing a first indium phosphide layer.

27. (New) A method as defined in claim 26, wherein the first indium phosphide layer has phosphorus vacancy type defects.

28. (New) A method as defined in claim 27, wherein step (b) further comprises providing, on top of the first indium phosphide layer, a second indium phosphide layer with defects that diffuse as phosphorus interstitial type defects.

29. (New) A method as defined in step 26, wherein the first indium phosphide layer has defects that diffuse as phosphorus interstitial type defects.